

OHANA, the AMBER/VLTI Snapshot Survey

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Abstract. We report on the OHANA interferometric snapshot survey, carried out by the VLTI group at the Paranal observatory. It makes use of observing time not useful for any other scheduled scientific or technical tasks in the sense of a backup programme, to characterize the mass-loss for early-type stars. The survey employs the combination of AMBER's high spectral and spatial resolution. The spatially unresolved central object provides a reference frame for the fringe properties observed in the light of the continuum.

1. Introduction

The **O**bservatory survey at **H**igh **A**ngular resolution of **A**ctive **O**B stars (OHANA) combines high spectral with high spatial resolution across the Br γ and HeI λ 2.056 lines to characterize the dynamics of winds and disks. It was carried out by the VLTI group at the Paranal observatory with the three-beam combining instrument AMBER (Petrov et al. 2007). The survey was designed to make use of the observing time not requested by other programs, usually due to bad weather or unsuitable local sidereal time slots.

2. Observations and Data Reduction

The initial survey targets, observed in ESO period P93, consisted of twelve bright Be stars, thirteen O and B type supergiants, and one interacting binary (see Table 1). Almost 300 observations were obtained. Due to the unforeseen availability of time P94 during a few weeks, the program was revived for this limited time and a few targets. However, mainly supergiants to complement the initial selection and more appropriate to the new range in right-ascension, were added, and only one additional Be star, Achernar.

By design, namely targeting quantities relative to the adjacent continuum, no calibrators were observed. However, in some nights calibrators, taken for technical purpose or other programs using the same setup, are available. These have been added to the database, too.

Basic data reduction was performed with amdlib, v3.0.6 (Tatulli et al. 2007; Chelli et al. 2009), and then processed further with idl. The raw data have become public immediately, the final reduction of the P93 Br γ observations is completed and will be made public. Reduction of the P94 and HeI λ 2.056 data is pending.

Table 1. Observed Be stars, their spectral types, and data obtained. For P93 observations, the number of observations on the small, intermediate, and large telescope configurations (s-i-l) are given for each spectral line. In P94 only Br γ was observed

Target	Sp. type	Br γ s-i-l	HeI λ 2.056 s-i-l
P93			
μ Cen	B2 Vnpe	2-5-3	0-1-0
χ Oph	B2 Vne	0-0-1	0-0-0
ζ Tau	B2 IVe-sh	2-1-0	1-0-0
δ Cen	B2 IVne	3-5-2	1-1-1
ϵ Cap	B3 Ve-sh	1-5-4	0-2-0
β^1 Mon A	B3 Ve	6-8-0	2-1-0
β^1 Mon B	B3 ne	2-1-0	0-0-0
β^1 Mon C	B3 e	2-1-0	0-0-0
P Car	B4 Vne	6-5-2	2-3-1
β Psc	B6 Ve	1-4-4	0-2-0
η Tau	B7 IIIe	0-0-0	1-0-0
Electra	B8 IIIe	0-0-0	1-0-0
P94			
χ Oph	B2 Vne	4	
ϵ Cap	B3 Ve-sh	7	
α Eri	B4 Vne	8	
β Psc	B6 Ve	5	

3. Data Description and First Impressions

Due to the snapshot/backup/filler nature of the program, the data quality is inhomogeneous. Typical values for a good data set are an uncertainty of the visibility (normalized to unity) of about ± 0.05 , and of the phase $\pm 2^\circ$, at a SNR of the combined spectrum of above 100. Selected data sets of the target stars are shown in Figs. 1 and 2. For each of the four targets, four baselines are shown, taken from two observations. The uppermost panels for each target show the flux spectra, then subpanels a-d show visibility and phase (upper and lower resp. profiles), while the centered panel show the (u, v) plane covered by the four baselines shown.

Visual inspection of the Be star observations shows them to be compatible with the canonical picture, namely a circumstellar decretion disk. The targets span all inclinations (equatorial to pole-on) and spectral subtypes. For some of the brighter stars the disk is already well resolved in the intermediate configuration (typical baseline lengths 30–70m), and overly resolved in the large configuration (typical baseline lengths 80–

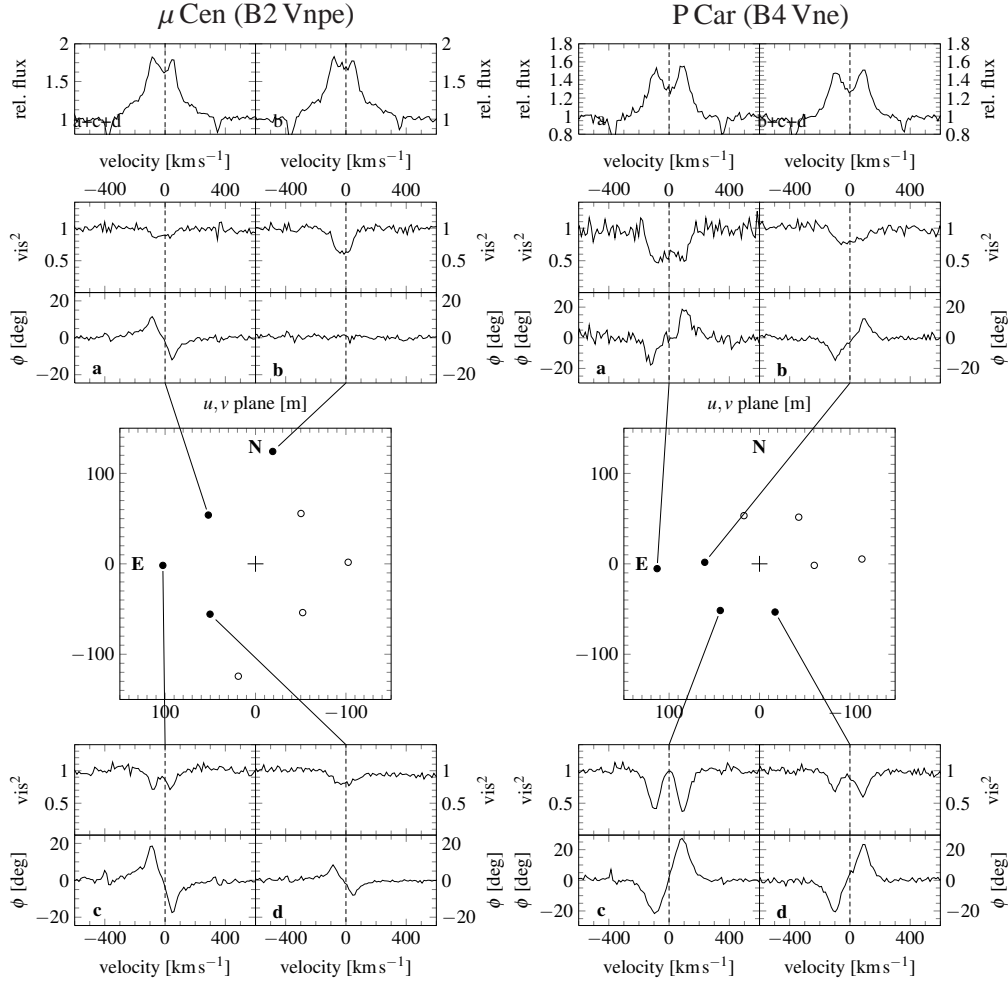


Figure 1. Example of OHANA data for the Be stars μ Cen and P Car.

130m) Data for β^1 Mon and μ Cen are shown in Fig. 1. μ Cen shows a broad shallow ramp-type wing in the line, which is reflected in the phase. This may be the signature of freshly ejected material closer to the star than the bulk of the disk.

4. Conclusions

The OHANA survey provided interferometric data of the circumstellar environments of Be stars and OBA supergiants. The raw data is publicly available, the reduced data will become so as soon as the final reduction has passed quality control tests. The reduced data will be made available at:

<http://activestars.iag.usp.br/index.php/34-ohana>.

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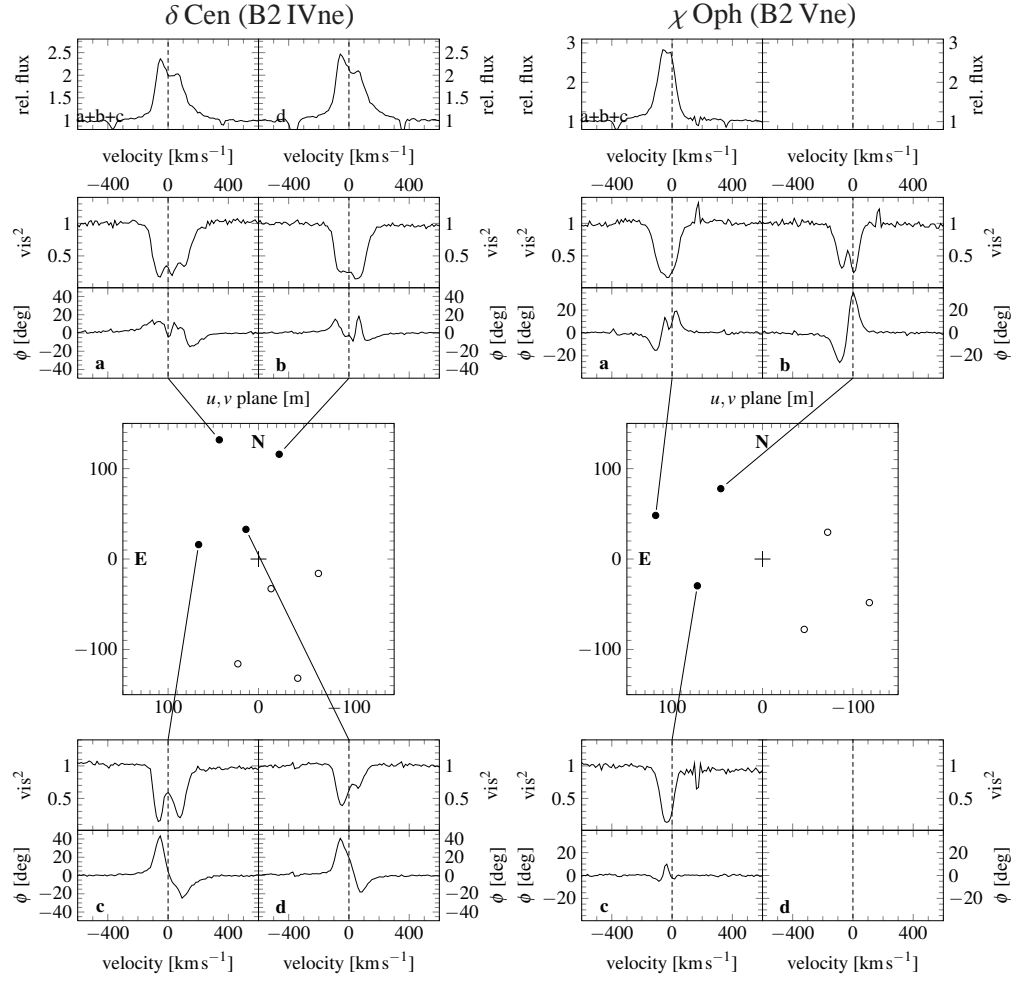


Figure 2. Example of OHANA data for the Be stars δ Cen and χ Oph.

References

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